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Infrastructure, buildings, environment, communications

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ARCADIS G&M, Inc.
441 New Karner Road
Suite 4
Albany
New York
Tel 518 452 7826
Fax 518 452 4398

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From:
Marc W. Sanford

Date:
July 12, 2002

Subject:
Remedial Construction Completion Report

ARCADIS Project No.:
AY000265.0005.00003

We are sending you:

☒ **Attached** ☐ **Under Separate Cover Via _____ the Following Items:**

☐ Shop Drawings ☐ Plans ☐ Specifications ☐ Change Order
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Copies	Date	Drawing No.	Rev.	Description	Action*
1				Remedial Construction Completion Report	
1				Drawings	

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Remedial Construction Completion Report

West Lot Site, Lockheed Martin Corporation, Utica, New York

NYSDEC Site ID #633036

PREPARED FOR

Lockheed Martin Corporation

ARCADIS

Infrastructure, buildings, environment, communications

ARCADIS

Edward W. Roberts
Senior Engineer

Marc W. Sanford
Principal Scientist/Area Manager

ARCADIS Engineers & Architects of New York, P.C.

Frank C. Lenzo, P.E.
Vice President
License Number 073296-1, New York

Remedial Construction Completion Report

West Lot Site, Lockheed Martin Corporation, Utica, New York

NYSDEC Site ID #633036

Prepared for:
Lockheed Martin Corporation

Prepared by:
ARCADIS G&M, Inc.
441 New Karner Road
Suite 4
Albany
New York 12205
Tel 518 452 7826
Fax 518 452 4398

Our Ref.:
AY000265.0005

Date:
July 11, 2002

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DISCLOSURE STATEMENT

THE LAWS OF NEW YORK STATE REQUIRE CORPORATIONS THAT RENDER ENGINEERING SERVICES IN NEW YORK BE OWNED BY INDIVIDUALS LICENSED TO PRACTICE ENGINEERING IN THE STATE. ARCADIS G&M, INC. CANNOT MEET THAT REQUIREMENT. THEREFORE, ALL ENGINEERING SERVICES RENDERED TO INGERSOLL-RAND COMPANY IN NEW YORK ARE BEING PERFORMED BY ARCADIS ENGINEERS & ARCHITECTS OF NEW YORK, P.C., A NEW YORK PROFESSIONAL CORPORATION QUALIFIED TO RENDER PROFESSIONAL ENGINEERING SERVICES IN NEW YORK. THERE IS NO SURCHARGE OR EXTRA EXPENSE ASSOCIATED WITH THE RENDERING OF PROFESSIONAL SERVICES BY ARCADIS ENGINEERS & ARCHITECTS OF NEW YORK, P.C.

ARCADIS G&M, INC. IS PERFORMING ALL THOSE SERVICES THAT DO NOT CONSTITUTE PROFESSIONAL ENGINEERING AND IS PROVIDING ADMINISTRATIVE AND PERSONNEL SUPPORT TO ARCADIS ENGINEERS & ARCHITECTS OF NEW YORK, P.C. ALL MATTERS RELATING TO THE ADMINISTRATION OF THE CONTRACT WITH LOCKHEED MARTIN CORPORATION ARE BEING PERFORMED BY ARCADIS G&M, INC. PURSUANT TO ITS AMENDED AND RESTATED SERVICES AGREEMENT WITH ARCADIS ENGINEERS & ARCHITECTS OF NEW YORK, P.C. ALL COMMUNICATIONS SHOULD BE REFERRED TO THE DESIGNATED PROJECT MANAGER AT ARCADIS G&M, INC.

1. Introduction

ARCADIS G&M, Inc. (ARCADIS), in association with ARCADIS Engineers & Architects of New York, P.C., have prepared this Remedial Construction Completion Report on behalf of the Lockheed Martin Corporation (LMC) to document the construction and implementation of a remedial design at the West Lot site located in Utica, New York (Figure 1). In March of 1998, the New York State Department of Environmental Conservation (NYSDEC) issued a Record of Decision (ROD) that presented the selected remedial actions for impacted soil and groundwater at the site. The objectives of the remedial action at the West Lot site are to reduce the volatile organic compounds (VOCs) in groundwater and to eliminate the threat to surface waters by eliminating or mitigating any future contaminated groundwater discharging to downgradient streams.

The remedial design (RD) activities were conducted pursuant to the Administrative Order on Consent (AOC) No. A6-0001-98-08, entered into by LMC with the NYSDEC in March 1999. As required by the remedial design/remedial action (RD/RA) work plan, the groundwater remedy includes a groundwater extraction and treatment system to capture and treat the VOCs in the shallow groundwater near the former burn pit area. The system as constructed consists of a groundwater extraction well (PW-1), approximately 2100 feet of trenching and piping, and a retrofit of the existing groundwater extraction and treatment system associated with the Solvent Dock area. The existing treatment system utilizes a low-profile air stripper, which is currently housed in the treatment building.

This report summarizes the completed construction associated with implementation of the RD/RA work plan and includes Record Drawings for the groundwater extraction and treatment system. This report is organized into the following sections: Section 2.0 Site Location and Background, describes the area of concern and the constituents of concern (COCs); Section 3.0 Groundwater Extraction and Treatment System Construction, describes the equipment and instrumentation, pumps, piping, treatment process and controls; Section 4.0 Site Restoration, describes the initial and final site restoration; Section 5.0 System O&M and Performance Monitoring, describes the operation and maintenance associated with the system equipment, and a general description of groundwater sampling and monitoring; Section 6.0 Construction Completion Certification; and Section 7.0 References, lists the documents used in the preparation of this report.

2. Site Location & Background

The Lockheed Martin Corporation West Lot site (referred to hereafter as "the site") is located on French Road in Utica, New York in Oneida County. The site is an inactive hazardous waste disposal site and is currently listed as a Class 2 site on the New York State Registry of Inactive Hazardous Waste Sites (Site No. 633036). The site is an undeveloped area encompassing approximately two acres, and is accessible from French Road in Utica, New York (Figure 2). The majority of the site is covered by mixed vegetation and contains no buildings, except a storage shed and blower house constructed during the soil Interim Remedial Measure (IRM) in 1993 and 1994. Adjacent and to the east of the West Lot site is the former LMC facility, historically used to manufacture electrical components. ConMed Inc., a company that manufactures and distributes medical supplies, now occupies the facility. ConMed leases the facility from its current owners, the Oneida County Development Agency. Although LMC no longer owns the property (including the site) LMC has retained the responsibility for implementing the remediation activities specified in the ROD.

The primary constituents of concern (COCs) at the site are cis-1,2 dichloroethylene (DCE), trichloroethylene (TCE), 1,1,1 trichloroethane (TCA), vinyl chloride (VC), benzene, toluene, ethylbenzene, and xylene (BTEX). The highest concentrations of the COCs are located in the area of the burn pit and directly downgradient. Historical concentrations of volatile organic contaminants (VOCs) in groundwater from March 1995 through October 2000 are presented on Figure 3.

The existing groundwater collection and treatment system collects and treats groundwater from the area outside of the northeast corner of the ConMed building and from along the northern perimeter boundary, collectively referred to as the Solvent Dock area. The system conveys the extracted groundwater to a treatment building for the removal of VOCs via a low-profile air stripper and discharges the treated effluent to the municipal storm sewer. As described in the RD Work Plan, groundwater from the West Lot site is conveyed to the Solvent Dock treatment system; the construction of the facilities related to the site is discussed below.

3. Groundwater Extraction & Treatment System Construction

SLC Environmental Services was the construction contractor retained to install the groundwater extraction system at the site, which consisted of the extraction well (PW-1), approximately 2100-feet of trench and pipeline, and the retrofit of the existing treatment system including process controls. The construction of the system

commenced in early November 2001 and was completed by the end of December 2001. Start-up and shakedown of the system was conducted during the first week of January 2002 with the system brought on-line January 04, 2002.

ARCADIS and ARCADIS Engineers & Architects of New York, P.C., provided construction management and engineering supervision including the daily documentation of work activities, equipment utilized, quantity and specifications of materials, scheduling, and health & safety tailgate meetings. SLC conducted the fieldwork in accordance with the design plans and technical specifications, and informed ARCADIS where modifications were necessary. Overall construction progress was reviewed during periodic visits by NYSDEC. A limited number of minor modifications to the design were reviewed by the Project Manager, Supervising Engineer, and the Engineer of Record. A summary of the construction process, equipment, materials, and modifications to the original design are documented in this report and presented on the Record Drawings (Drawing Nos. X-1, C-1 through C-5, W-1 through W-4, and E-1 through E-3).

3.1 General Description

The major components of the groundwater extraction and treatment system are as follows:

- Extraction well PW-1, concrete vault, pump and controls;
- Two collection trenches with Manholes #1 and #2, pumps, and controls (existing);
- Approximately 2100-feet of trench and pipeline from PW-1 to the treatment building;
- Pre-engineered metal treatment building set on a concrete slab (existing);
- Treatment system including low-profile air stripper and controls (existing);
- Interlocked system with alarms connected to an autodialer; and
- Performance Monitoring Wells (existing).

The system is automated with local and remote access capabilities via the process controls, alarms, and autodialer.

3.2 Extraction Well PW-1 Equipment and Associated Piping

This section includes a description of the site extraction well PW-1, PW-1 vault, and the trench and piping to the treatment system (Drawing Nos. C-2 through C-5, W-1 and W-2).

3.2.1 Extraction Well PW-1 and Vault

The location of PW-1 is approximately at station 2+78 (Drawing No. C-2). A pre-cast concrete vault was installed to house the PW-1 wellhead in order to accommodate below grade piping, a pressure gage, check valve, sample port, ball valve, power supply line with an emergency shut-off switch and electrical control lines (Drawing Nos. W-1 and W-2). The concrete vault has internal dimensions of 4-feet by 4-feet with a depth of 4.5-feet, set on a gravel base with gravel backfilled around the outside walls for proper drainage, a hinged aluminum hatch for access to the vault (manway), and an internal 2-piece aluminum grate platform (original design specification was one piece) at approximately 3.75-feet below the top of the vault for use as a working platform during operation and maintenance activities. The process controls associated with the extraction well PW-1 comprise the primary elements of the retrofit to the existing Solvent Dock groundwater treatment system housed in the pre-engineered treatment building.

The extraction well PW-1 was previously installed and is constructed with 16-feet of 6-inch diameter poly vinyl chloride (PVC) well casing and 10-feet of 6-inch diameter stainless steel 0.010-inch (10 slot) well screen. The well was installed to a depth of 26-feet below land surface (ft bls) and is screened from 16- to 26-ft bls.

Groundwater is extracted from PW-1 with a 1.5-horsepower Grundfos submersible pump (Model #25E8). The submersible pump is capable of sustaining the design flow rate of 20 gpm at a total discharge head of 70 psig. The pump discharges the extracted groundwater via a pitless adaptor (modification) to a 2-inch diameter high-density polyethylene (HDPE) pipeline connected to the treatment system.

3.2.2 PW-1 Trench, Pipeline, and Appurtenances

A trench approximately 2100-feet long, 18-inches wide, and 4-feet deep was excavated for the installation of a pipeline from PW-1 to the treatment system. The as-built survey of the actual trench alignment and profile is shown on Drawing Nos. C-1 through C-5. A cross-section of the trench is provided on Drawing No. W-2. Buried

in the trench from land surface to the bottom of the trench are the following: electrical warning tape at 0.5-ft bls, two electrical conduits [one 2-inch and one 1-inch (spare)] for power supply at 2-ft bls, water line warning tape at 2.5-ft bls, and 2-inch HDPE pipeline at 4-ft bls. The paved areas of the alignment traversed by the trench contain sections of conduit encased in a minimum of 3-inches of concrete and pipeline embedded in a minimum of 6-inches of sand equal to the full width of the pavement. A field modification was made to the dimensions of the trench (see Drawing No. W-2 for record of change) which includes a vertically cut trench with the electrical conduits installed directly above the pipeline versus installing the conduit in a secondary trench (notch) cut adjacent to the primary trench as depicted in the original design. In addition, the alignment of the trench was adjusted in a number of locations along its length, most notably in the area of the West Lot between stations 4+00 through 6+00, stations 9+00 through 10+50, and the area along the northern boundary of the facility between stations 14+00 and 23+00 (refer to Drawing Nos. C-2 through C-5).

Four (4) electrical pull boxes (EPB) were installed at approximately 400-foot centers along the alignment of the trench (stations 7+44, 11+23, 16+67, and 20+55) to facilitate the installation of the electrical wiring inside the 2-inch conduit from PW-1 to the treatment system (refer to Drawing Nos. C-2 through C-5).

Seven (7) cleanouts (CO) were installed at approximately 200- to 400-foot centers along the alignment of the trench (stations 4+44, 8+32, 10+54, 12+24, 15+78, 19+68, and 22+32) to facilitate the future cleaning of the pipeline to remove potential obstructions (refer to Drawing Nos. C-2 through C-5). The cleanouts each consist of a Y-section connected to the 2-inch HDPE pipeline, a 45 degree transition section, a 2-inch ball valve to seal off the pipeline from the cleanout, a 6-inch protective steel casing with locking cap to allow for access to the ball valve with a 7-foot T-handle wrench, and a 4-inch protective steel casing with locking cap to allow for access to the inlet of the cleanout (refer to Drawing No. W-2).

The 2-inch HDPE pipeline enters the treatment building through a chase located along the north wall. The chase is constructed of mortar and cinder blocks, sealed with an epoxy coating, foam insulated, with a diamond cut steel plate and rubber gasket bolted to the top of the chase to prevent unauthorized access. The pipe was winterized inside the chase via the installation of heat trace tape around the section of pipe located above the frost line (i.e., 4-ft bls to the entrance into the heated treatment building). The pipe enters the treatment building and connects to a 2-inch PVC line, traverses vertically up the inside of the north wall, elbows 90 degrees, traverses across the room supported from the ceiling by steel rod hangers, elbows 90 degrees, and connects to the eastern

port in the top tray of the low-profile air stripper (refer to Drawing Nos. W-1 through W-4). This pipe functions as the influent line to the stripper from the PW-1 recovery system. The following appurtenances were installed along this segment of the pipe inside the treatment building: two ball valves, pressure gauge, sampling port, in-line flow meter (totalizer), and an air pressure relief valve at the high point of the line (i.e., along the horizontal section of the pipe supported by the hangers) that vents outside of the building along the north wall.

The design also specified the installation of an air pressure relief valve along the second high point of the pipeline alignment at approximately station 3+05; however, the location of the relief valve was modified to station 3+08 with the venting point offset 15-feet to the west of the pipeline. The air pressure relief valve was installed off a T-section in the pipeline, with 0.5-inch bushings from the T-section to the valve and back to a 2-inch PVC pipe that vents at approximately 2-feet above the ground surface protected by a 4-inch steel casing with locking cap (refer to Drawing Nos. C-2 and W-2).

3.3 Groundwater Treatment System

The existing groundwater recovery and treatment system was initially installed in May 1996 to address impacts in the Solvent Dock area. The system consists of two collection trenches (French Drains) and two manholes (MH-1 and MH-2) that are used to collect impacted groundwater from these areas. Each manhole is equipped with two sump pumps that alternate cycling on and off. The pumps convey the impacted groundwater to the low-profile air stripper of the treatment system. Flow from MH-1 and MH-2 enters the treatment building through subsurface piping and feeds the eastern port of the top tray of the air stripper [MH-2 influent line connects (T-section) to the MH-1 influent line prior to feeding the stripper], as shown on Drawing Nos. W-1 through W-4. These manholes pump at a total instantaneous daily maximum and average daily flow rate of 45 gpm and 25 gpm, respectively. The West Lot extraction well PW-1 contributes an additional continuous flow rate of 15 to 20 gpm to the air stripper for a total combined daily maximum and daily average flow rate of 65 gpm and 45 gpm, respectively. This section discusses the equipment and process controls of the groundwater treatment system, as shown on Drawing Nos. W-1 through W-4.

3.3.1 Treatment Equipment

The groundwater treatment system equipment is housed in a 24-foot-8-inch by 20-foot pre-engineered metal treatment building set on a concrete slab with secondary

containment diking and a building sump. The building contains the low-profile air stripper, four (4) influent flow meters with two (2) chart recorders, three (3) pump control panels and one (1) air stripper control panel, interlocks and alarms connected to an autodialer, and related electrical and mechanical components.

The air stripper is a stainless steel shallow tray model number 3631 manufactured by Northeast Environmental Products, Inc. The manufacturer specifications indicate the air stripper is capable of processing a maximum hydraulic load of 135 gpm. The air stripper is equipped with a 900-cubic feet per minute (cfm) blower, driven by a 15 hp, three-phase motor. At the maximum combined instantaneous flow rate of 65 gpm the blower will achieve a minimum air to water ratio of 100:1.

The influent water enters at the top of the air stripper and flows downward by gravity through three aeration trays. A countercurrent flow of ambient air is blown up through 3/16 inch-diameter holes in the aeration trays to enhance air/water mixing and create an adequate mass transfer surface area to ensure treatment. The dissolved-phase VOCs are driven out of the water stream via the concentration gradient between the water and the air.

3.3.2 Treatment System Effluent

The treated groundwater flows into a sump at the base of the low-profile air stripper and the effluent from the stripper discharges by gravity through a 4-inch diameter HDPE pipe to a 30-inch reinforced concrete pipe (RCP) of the Oneida County storm sewer system. The 30-inch RCP ultimately discharges to Nail Creek; therefore, the discharge to the sewer system is through a state permitted outfall (SPDES outfall No. 002). The SPDES permit was updated and approved by the NYSDEC in 2001 to reflect the combined flow of the Solvent Dock and West Lot groundwater recovery systems and discharge from the air stripper (refer to Appendix A for the NYSDEC Approved Modified SPDES Permit 2001).

3.3.3 Treatment Building Stack

The air stripper off-gas is discharged to the atmosphere through a 14-inch diameter, 28-foot high, stainless-steel exhaust stack. A 6-foot extension of the stainless-steel exhaust stack was welded to the existing 22-foot stack. The stack is supported through its entire height by a six-inch steel support pole and mounting steel brackets, which was extended during the retrofit of the stack.

3.3.4 Treatment Process Controls

The system has been upgraded to accommodate the addition of the SP-400 well pump, while still maintaining the interlock features controlling the operation of the existing airstripping system and manhole (MH) pumps. The controls are configured such that operation of the new SP-400 (PW-1) well pump will not be permitted unless all system permissive controls permit operation of the system within regulatory guidelines. Prior to allowing the PW-1 well pump to operate, the airstripper building air inlet damper and airstripper blower must be operating, and liquid levels in the airstripper and sumps be within normal operating levels. Should any of the operating permissive parameters fail to comply with these requirements, the system will shut down, a pilot light will illuminate on the main control (airstripper control) panel, and the autodialer will notify the system operator of the alarm/fault condition.

3.3.4.1 Control Panels

The system is controlled by a central airstipper control panel, located in the treatment building. All control logic relating to operating interlocks (blower operation, sump level, etc.) are located in this panel The two previously-existing duplex pump control sub-panels (MH-1 and MH-2) and the new simplex (single-pump) PW-1 pump panel are interlocked through the airstripper control panel. All control panels are located inside the airstripper building, mounted on the west wall. All three pump control panels are interlocked through the airstripper control panel, and will prohibit extraction pump operation in the event that the system is not within operational guidelines.

The following control operators are located on the air stripper control panel; Blower Hand/Off/Auto Switch, System On/Off Switch, Emergency Stop Pushbutton, Alarm Reset Pushbutton, Run Light and the Sump Pump level and pump controls.

The following control interlock circuits must be satisfied for the groundwater collection pumps (MH-1, MH-2 and PW-1) to operate (the airstripping system interlocks were existing prior to the PW-1 upgrade):

- Low Airstripper Blower Air Pressure - air pressure in the air stripper sump must be above the minimum air pressure;
- Damper Limit Switch - the treatment building air damper proving switch must be activated, indicating that the air inlet damper is open; and

- Airstripper Sump Level Switch - the air stripper sump level switch will prohibit operation of man hole pumps and the PW-1 well pump in the event that the liquid level in the airstripper sump is above the maximum design level.

The airstripper control panel is equipped with a feature which will allow intermittent (batch) operation of the airstripper blower. Due to the intermittent nature of the manhole pump operation, the airstipper blower would be shut down 10 minutes after the manhole pump(s) would finish their pump-down cycle. This feature will be unnecessary in the new operational configuration, due to the continuous operation of the PW-1 pump.

The newly-installed PW-1 control panel is equipped with the following features: PW-1 Pump Hand/Off/Auto Switch, Control Power On Pilot Light, SP-400 Motor Fault, Autodialer Off (autodialer de-activation switch), Emergency Stop Pushbutton, and an indicator which illuminates when the airstripper control system is not prepared to accept process water (PW-1 de-activation interlock).

In addition to the interlocks listed above, the airstripper control panel is equipped with a Treatment Building Sump High Level indicator/interlock. This will shut off the pumping manhole pumps and activate an alarm light on the air stripper panel if there is a high water level in the treatment building sump.

The airstripper panel will initiate a dialout alarm on the system autodialer if any of the alarms previously discussed occur. Additionally, the system will initiate an alarm dialout on the following alarms as well:

- A high sump level alarm in either manhole (MH-1 or MH-2).
- A fault condition is detected on the PW-1 pump controls (see description below)

The SP-400 pump in pumping well PW-1 is equipped with a control panel to monitor and control operation of the PW-1 pump. The PW-1 Hand/Off/Auto switch, pump run and fault indicators, and PW-1 pump control logic reside in this panel. The panel contains an integrated motor controller capable of detecting pump faults, including:

- Run dry condition (occurs when the pump's extraction rate exceeds the well's recovery rate)
- Motor overload condition

- Motor phase fault
- Motor underload condition

In the event of any of the alarms listed above, the SP-400 pump fault indicator light will illuminate, and the fault condition transmitted to the airstripper control panel (to activate the system autodialer).

3.3.4.2 Flow Meters and Chart Recorders

The system includes four flow meters: one on each of the three groundwater recovery influent lines to the air stripper (PW-1, MH-1, and MH-2) and a fourth on the treatment building sump pump influent line. These flowmeters are equipped with a local digital display, as well as an analog transmitter to send flow rate data to a chart recorder for logging.

The flow meter installed on the PW-1 conveyance line is a Signet Model 8011 with a design flow range of 0 to 60 gpm. The chart recorder for PW-1 is a Eurotherm Chessell Circular 2 channel chart recorder with one pen. The recording time duration of the circular chart recorder is a 30-day period.

The three previously-existing influent pipes from MH-1, MH-2, and the building sump pump are equipped with Signet Model 8011 flowmeters , each with a design flow range of 0 to 60 gpm. The chart recorder for all three meters is a Honeywell DPR 100 Multipoint. The chart recorder has four pens, one for each flow meter and a fourth pen for totalized flow.

3.3.4.3 Autodialer

The airstripper control panel is equipped with an autodialer (A Dialog Plus unit, manufactured by Kaye). When an alarm is activated, the autodialer will call a pre-programmed number and relay recorded alarm messages upon connection. The alarm messages are programmed into the autodialer on six channels and the potential causes are as follows:

- Channel 1 - High or Low level in Pumping Manhole No. 1
- Channel 2 - High Water Level in the Air Stripper Sump

- Channel 3 - High Water Level in the Treatment Building Sump
- Channel 4 - Low Air Pressure in the Air Stripper (blower malfunction)
- Channel 5 - High or Low level in Pumping Manhole No. 2
- Channel 6 - Motor Fault or Treatment System Fault

The operation & maintenance contractor (ARCADIS) is responsible for responding to all alarm conditions that occur.

4. Site Restoration

The trench alignment was backfilled as the placement of piping and electrical conduits progressed. Trench backfill material included the excavated trench spoils and imported clean sand. The trench was backfilled in 1-foot lifts compacted to a minimum 90% Modified Proctor Density (95% in paved areas). The compaction of each lift was tested and certified by Atlantic Testing laboratory.

The initial grading of the site occurred upon completion of the excavation and installation of the system. All silt fencing, remaining materials, and debris were removed from the site. The pavement areas were restored to pre-construction conditions. The grass areas were reseeded and mulched. Final site restoration including final grading and seeding occurred in May 2002.

5. System O&M and Performance Monitoring

The O&M Plan will include a description of system components, system start up and shut down procedures, system operation and maintenance procedures, system fail-safes, alarm conditions, troubleshooting, sampling and analysis requirements for the treatment system and the groundwater monitoring network, and a summary of primary contacts and equipment vendors.

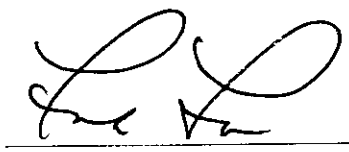
The plan will describe the groundwater-monitoring program, well sampling frequency, and collection of water level data to monitor aquifer response to pumping. Analytical parameters for the groundwater monitoring program consist of the primary COCs at the site (chlorinated VOCs and BTEX).

The treatment system is automated so that manned operation is not necessary on a continual basis. Routine inspection of the system and verification of the operating parameters will be performed on a monthly basis in compliance with the O&M Plan. The system incorporates provisions for automatic shutdown and remote alarm condition annunciation (autodialer). In the event of an alarm condition, the autodialer will notify ARCADIS personnel of the condition, the system will be inspected, the problem (if any) rectified, and the system will be restarted.

The O&M Plan will include a detailed discussion of the operation, maintenance and monitoring program for the site and the treatment system.

6. Construction Completion Certification

This is to certify that the Groundwater Extraction and Treatment System Remedial Design was implemented, and construction activities were completed in accordance with the Remedial Design Work Plan, as approved by NYSDEC.



Frank C. Lenzo, PE

ARCADIS Engineers & Architects of New York, P.C.

License Number 073296-1, New York

7. References

ARCADIS Geraghty & Miller 2001. *100% Groundwater Remedial Design*; West Lot Site, Utica, NY. March 2001.

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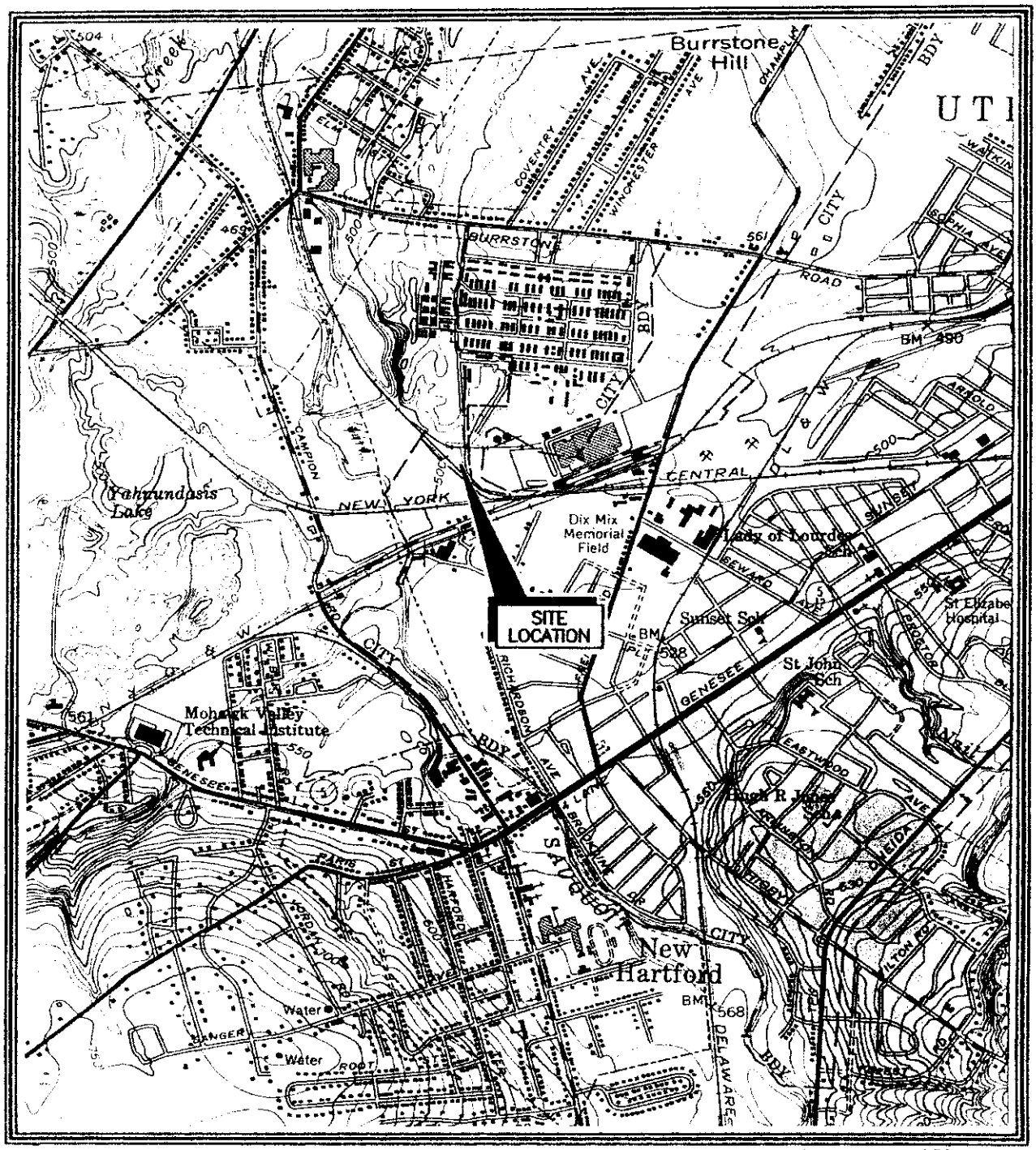
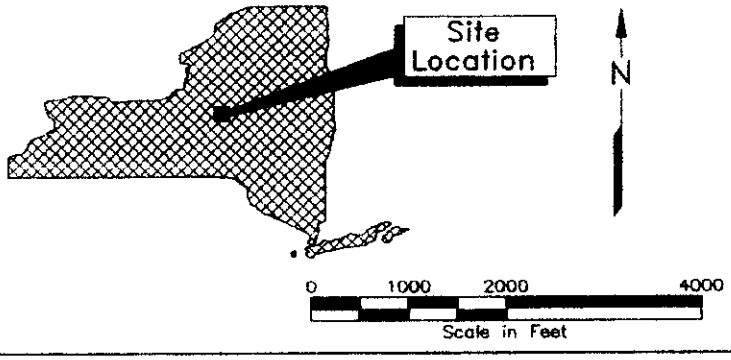
Blasland, Bouck & Lee, Inc. (BBL). 1994. Sampling and Analysis Plan, West Lot Site, Utica, New York. Syracuse, NY. May 1994.



Reference: U.S. Geological Survey, 7.5 x 15 Minute Quadrangle, Utica West, New York, 1955.



SITE LOCATION		
WEST LOT SITE Utica, New York		
DRAWN: TAD/G274	DATE:	FIGURE 1
APP'D: MS	JULY 2002	

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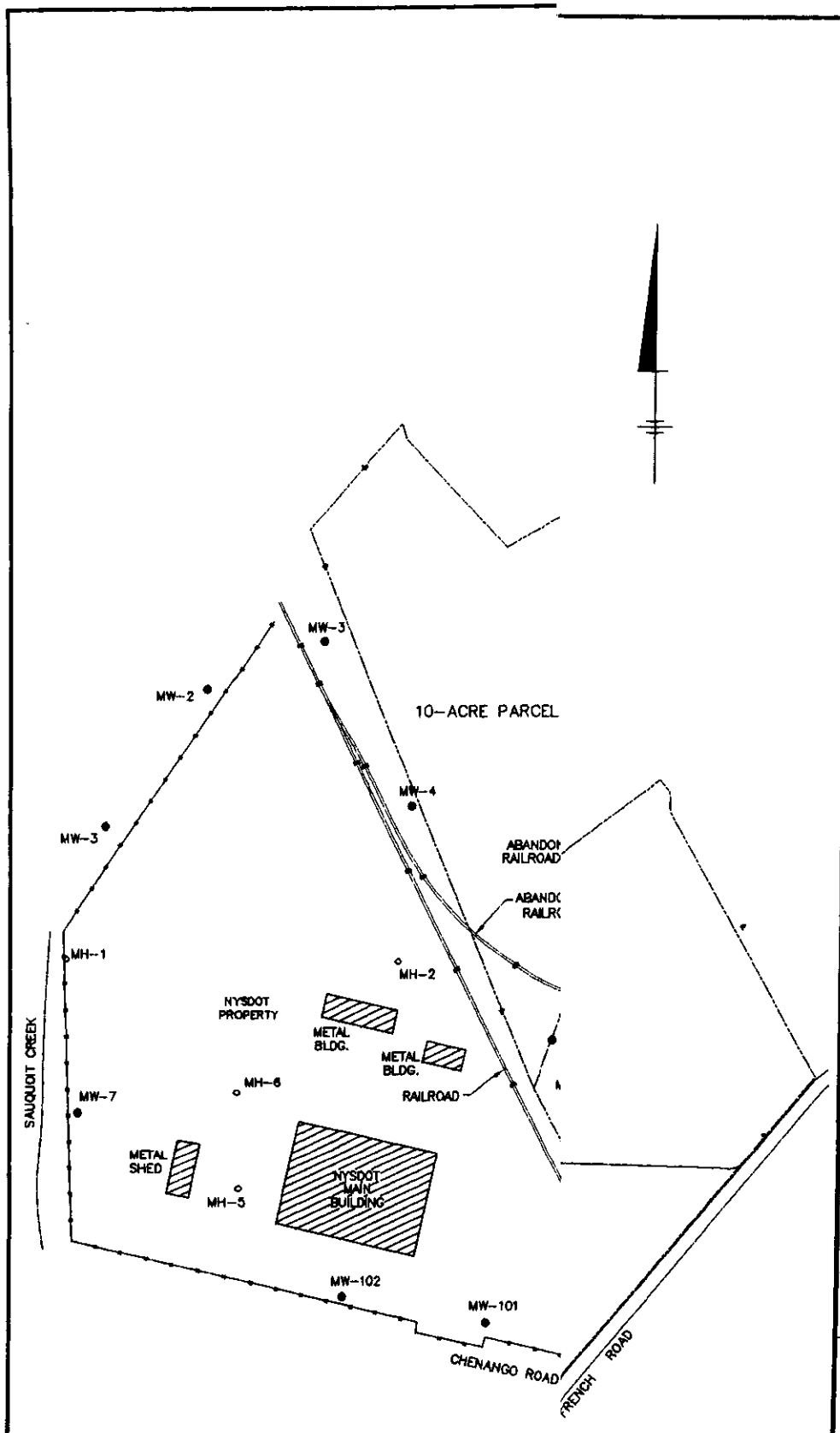

NO.	DATE	REVISION DESCRIPTION	BY / CKD

ARCADIS
441 New Karner Rd., Suite 4
Albany, New York 12205
Tel: 518/452-7826 Fax: 518/452-4396

SITE MAP

LOCKHEED MARTIN
WEST LOT SITE

PROJECT MANAGER M. SANFORD	DRAWING NUMBER G274K
CHECKED BY N. TUDOR	PROJECT NUMBER AYD002850005
DRAWN BY FJF/Adecco	FIGURE NUMBER 2

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Appendix A

NYSDEC Approved Modified
SPDES Permit 2001

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section I - Permittee and Facility Information

Please type or print the requested information.

1. Current Permit Information (leave blank if for new discharge)

SPDES Number: **NY-0121894**	DEC Number: **6-3016-00027/00001**

2. Permit Action Requested: (Check applicable box)

[ ] A **NEW** proposed discharge

[X] A **MODIFICATION** of the existing permit

[ ] An **EBPS INFORMATION REQUEST** response

[ ] An **EXISTING** discharge currently without permit

[ ] A **RENEWAL** of an existing SPDES permit

Does this request include an increase in the quantity of water discharged from your facility to the waters of the State?

[X] **YES** - Describe the increase: Addition of groundwater extraction well with flow rate of 20-30 gpm.

[ ] **NO** - Go to Item 3. below.

3. Permittee Name and Address

Name Lockheed Martin Corporation		Attention Jennifer Stevens
Street Address 7921 Southpark Plaza		
City or Village Littleton	State CO	ZIP Code 80120

4. Facility Name, Address and Location

Name Lockheed Martin Corporation c/o Manager ESH			
Street Address 525 French Road		P.O. Box	
City or Village Utica	State NY	ZIP Code 13502	
Town Utica	County Oneida		
Telephone 518-452-7826	FAX 518-452-4398	NYTM-E 477.0	NYTM-N 4770.3
Tax Map Info (New York City, Nassau County and Suffolk County only)			
Section	Block	Subblock	Lot

5. Facility Contact Person

Name Marc Sanford		Title Principal Scientist	
Street Address 411 New Karner Rd., Suite 4			P.O. Box
City or Village Albany		State NY	ZIP Code 12205
Telephone 518-452-7826	FAX 518-452-4398	Email or Internet	msanford@arcadis-us.com

6. Discharge Monitoring Report (DMR) Mailing Address

Mailing Name ARCADIS G & M			
Street Address 411 New Karner Rd., Suite 4			P.O. Box
City or Village Albany		State NY	ZIP Code 12205
Telephone (518)452-7826	FAX (518)452-4398	E-Mail or Internet	www.arcadis-us.com
Name and Title of person responsible for signing DMRs Marc W. Sanford, Principal Scientist		Signature	Marc W. Sanford

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name: **Lockheed Martin Corporation**	SPDES Number: NY-0121894

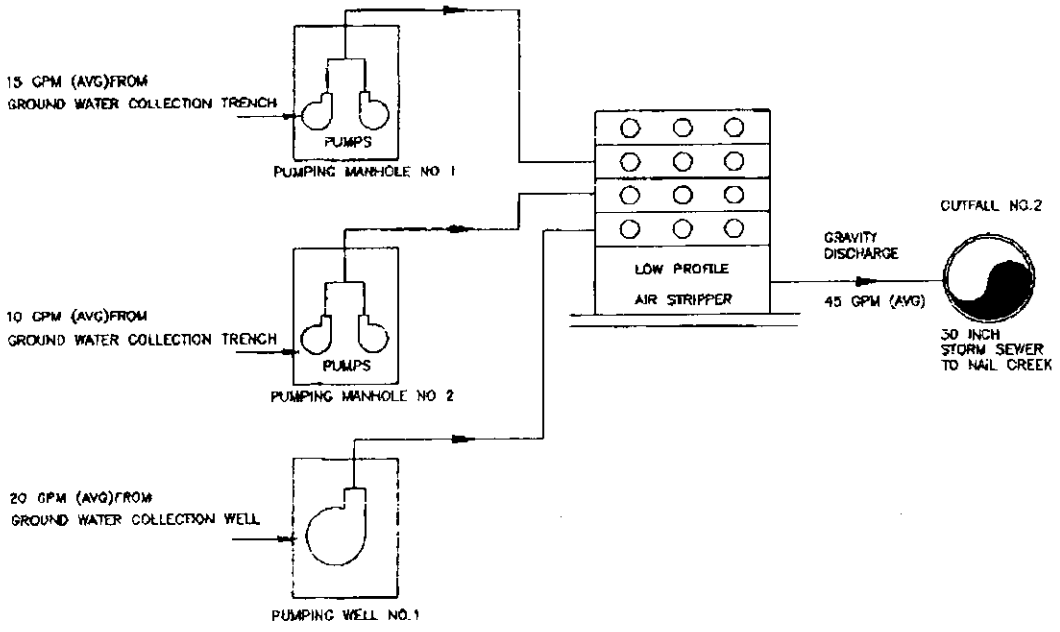
7. Summarize the outfalls present at the facility:

Outfall Number	Receiving Water	Type of discharge
002	Nail Creek via Storm Sewer Connection	Remediation System Discharge

8. Map of Facility and Discharge Locations:

Provide a detailed map showing the location of the facility, all buildings or structures present, wastewater discharge systems, outfall locations into receiving waters, nearby surface water bodies, water supply wells, and groundwater monitoring wells, and attach it to this application. Also submit proof, either by indication on the map or other documentation, that a right of way for the discharges exists from the facility property to a public right of way.

9. Water Flow Diagram:



INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name: **Lockheed Martin Corporation**	SPDES Number: **NY-0121894**

10. Nature of business: (Describe the activities at the facility and the date(s) that operation(s) at the facility commenced)

Remediation of impacted groundwater, via a groundwater pump and treat system to comply with the NYSDEC Record of Decision

11. List the 4-digit SIC codes which describe your facility in order of priority:

Priority 1	Description:	Priority 3	Description:
Priority 2	Description:	Priority 4	Description:

12. Is your facility a primary industry as listed in Table 1 of the instructions?

[ ] YES - Complete the following table.

[ ] NO - Go to Item 13. below.

Industrial Category	40 CFR		Industrial Category	40 CFR	
	Part	Subpart		Part	Subpart

13. Does this facility manufacture, handle, or discharge recombinant-DNA, pathogens, or other potentially infectious or dangerous organisms?

[ ] YES - Attach a detailed explanation to this application

[X] NO - Go to Item 14 below

14. Is storm runoff or leachate from a material storage area discharged by your facility?

[ ] YES - Complete the following table, and show the location of the stockpile(s) and discharge point(s) on the diagram in Item 9.

[X] NO - Go to Item 15 on the following page.

Size of area (include units)	Type(s) of material stored	Quantity of material stored (include units)	Runoff control devices

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name: **Lockheed Martin Corporation**	SPDES Number: NY-0121894

15. Facility Ownership: (Place an "X" in the appropriate box)

Corporat [X] Sole Proprietorship [ ] Partnership [ ] Municipal [ ] State [ ] Federa [ ] Other [ ]

Are any of the discharges applied for in this application on Indian lands? Yes [ ] No [X]

16. List information on any other environmental permits for this facility:

Issuing Agency	Permit Type	Permit Number	Permit Status		
			Active	Applied for	Inactive

17. Laboratory Certification:

Were any of the analyses reported in Section III of this application performed by a contract laboratory or a consulting firm?

[X] **YES** - Complete the following table.

[ ] **NO** - Go to Item 18 below.

Name of laboratory or consulting firm	Address	Telephone (area code and number)	Pollutants analyzed
Severn Trent Laboratories	10 Hazelwood Drive, Suite 106, Amherst, New York 14228	716-691-2600	PCE, TCE, 1,1-TCA, 1,1-DCA, 1,2 DCE, Vinyl Chloride, Chloroethane, Ethylbenzene, Toluene, Xylenes, Benzene (VOCs)

18. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and official title (type or print) Jennifer Stevens		Date signed 6/25/01
Signature Jennifer Stevens Director, ESH Operations	Telephone number (303) 971-1892	FAX number (303) 971-5065

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name: **Lockheed Martin Corporation**	SPDES Number: **NY-0121894**

19. Industrial Chemical Survey (ICS)

Complete all information for those substances your facility has used, produced, stored, distributed, or otherwise disposed of in the past five (5) years at or above the threshold values listed in the instructions. Include substances manufactured at your facility, as well as any substances that you have reason to know or believe present in materials used or manufactured at your facility. Do not include chemicals used only in analytical laboratory work, or small quantities of routine household cleaning chemicals. Enter the name and CAS number for each of the chemicals listed in Tables 6-10 of the instructions, and the table number which lists the chemical. You may use ranges (e.g. 10-100 lbs., 100-1000 lbs., 1000-10000 lbs., etc.) to describe the quantities used on an annual basis as well as for the amount presently on hand. For those chemicals listed in Tables 6, 7, or 8 which are indicated as being potentially present in the discharge from one or more outfalls at the facility, indicate which outfalls may be affected in the appropriate column below, and include sampling results in Section III of this application for each of the potentially affected outfalls. Make additional copies of this sheet if necessary.

Name of Substance	Table	CAS Number	Average Annual Usage	Amount Now On Hand	Units (gallons, lbs, etc)	Purpose of Use (see codes in Table 2 of instructions)	Present in Discharge? (Outfall(s)?)

This completes Section I of the SPDES Industrial Application Form NY-2C. Section II, which requires specific information for each of the outfalls at your facility, and Section III, which requires sampling information for each of the outfalls at your facility, must also be completed and submitted with this application.

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested

Facility Name: **Lockheed Martin Corporation**	SPDES Number: **NY-0121894**

1. Outfall Number and Location

Outfall No.: 002		
Latitude **42° 05 ' 14 "**	Longitude **75° 16 ' 57"**	Receiving Water **Nail Creek via a storm sewer**

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units MGD	Units GPM	Units Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge	45 (daily avg.)		X	
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water				
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
23.65 MG	0.0432 MGD	0.0698 MGD	0.0936 MGD	0.1152 MGD

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name: **Lockheed Martin Corporation**	**Outfall No.:** 002
	SPDES Number: **NY-0121894**

5. Is this a seasonal discharge?

[ ] **YES** - Complete the following table.

[X] **NO** - Go to Item 6 below.

Operations contributing flow (list)	Discharge frequency		Flow				
	Batches per year	Duration per batch	Flow rate per day		Total volume per discharge	Units	Duration (Days)
			LTA	Daily Max			

6. Water Supply Source (indicate all that apply)

	Name or owner of water supply source	Volume or flow rate	Units (check one)		
Municipal Supply			MGD	GPD	GPM
Private Surface Water Source			MGD	GPD	GPM
Private Supply Well			MGD	GPD	GPM
Other (specify)	Groundwater Extraction Wells, MH-1, MH-2 & PW-1	45	MGD	GPD	X GPM

7. Outfall configuration: (Surface water discharges only)

A. Where is the discharge point located with respect to the receiving water?

In the streambank: [ ]

In the stream: [ ]

Within a lake or ponded water: [ ]

Within an estuary: [ ] Attach Supplement C, MIXING ZONE REQUIREMENTS FOR DISCHARGES TO ESTUARIES.

Discharge is equipped with diffuser: [ ] Attach description, including configuration and plan drawing of diffuser, if used.

B. If located in a stream, approximately what percentage of stream width from shore is the discharge point located?

10% [ ] **25%** [ ] **50%** [ ] **Other:** [ ]

C. If located in a stream, describe the stream geometry in the general vicinity of the discharge point, under low flow conditions:

Stream width	Stream depth	Stream velocity	Are the results of a mixing/diffusion study attached?	
Feet	**Feet**	**Feet/Sec**	[ ]	**YES**
			[ ]	**NO**

Section II - Outfall Information

Outfall No.: 002
SPDES Number: **NY-0121894**

Facility Name: **Lockheed Martin Corporation**

8. Thermal Discharge Criteria

Is your facility one of the applicable types of facilities listed in the instructions, and does the temperature of this discharge exceed the receiving water temperature by greater than three (3) degrees Fahrenheit?

[ ] **YES** - Complete the following table.

[ ] **Information on the intake and discharge configuration of this outfall is attached.**

[X] **NO** - Go to Item 9. below.

Discharge Temperature, deg. F			Duration of maximum discharge		Dates of maximum discharge		Maximum	Discharge configuration (e.g. subsurface, surface,
Average change in temperature (delta T)	Maximum change in temperature (delta T)	Maximum temperature	hours per day	days per year	From	To	MGD	

9. Are any water treament chemicals or additives that are used by your facility subsequently discharged through this outfall?

[ ] **YES** - Complete the following table and complete pages 1 of 3 and 2 of 3 of Form WTCFX for each water treatment chemical listed.

[X] **NO** - Go to Item 10. below.

Manufacturer	WTC trade name	Manufacturer	WTC trade name

10. Has any biological test for acute or chronic toxicity been performed on this outfall or on the receiving water in relation to this outfall in the past three (3) years?

[ ] **YES** - Complete the following table.

[X] **NO** - Go to Item 11. on the following page.

Water tested	Purpose of test	Type of test	Chronic or Acute?	Subject species	Testing date(s)		Submitted? (Date)
					Start	Finish	

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name: **Lockheed Martin Corporation**	**Outfall No.: 002**
	SPDES Number: **NY-0121894**

11. Is the discharge from this outfall treated to remove process wastes, water treatment additives, or other pollutants?

[X] **YES** - Complete the following table. Treatment codes are listed in Table 4.

[ ] **NO** - Go to Item 12 below.

Treatment process	Treatment Code(s)	Treatment used for the removal of:	Design Flow Rate (include units)
Air stripping	1-Y	VOCs	80 gpm max

12. Does this facility have either a compliance agreement with a regulating agency, or have planned changes in production, which will materially alter the quantity and/or quality of the discharge from this outfall?

[ ] **YES** - Complete the following table.

[X] **NO** - Go to Section III on the following page.

Description of project	Subject to Condition or Agreement in existing permit or consent order? (List)	Change due to production increase?	Completion Date(s)	
			Required	Projected

This completes Section II of the SPDES Industrial Application Form NY-2C. Section I, which requires general information regarding your facility, and Section III, which requires sampling information for each of the outfalls at your facility, must also be completed and submitted with this application.

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: **Lockheed Martin Corporation**	SPDES No.: **NY-0121894**	**Outfall No.:** 002

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing this page.

Pollutant	Effluent data							Units		Intake data (optional)		
	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. Number of analyses	e. Concentration	f. Mass	g. Concentration	h. Long term average mass	i. Number of analyses
	1. Concentration	2. Mass	1. Concentration	2. Mass	1. Concentration	2. Mass						
a. Biochemical Oxygen Demand, 5 day (BOD)												
b. Chemical Oxygen Demand (COD)												
c. Total Suspended Solids (TSS)												
d. Total Dissolved Solids (TDS)												
e. Oil & Grease												
f. Chlorine, Total Residual (TRC)												
g. Total Organic Nitrogen (TON)												
h. Ammonia (as N)												
i. Flow	Value		Value		Value					Value		
j. Temperature, winter	Value		Value		Value			DEGREES CELSIUS		Value		
k. Temperature, summer	Value		Value		Value			DEGREES CELSIUS		Value		
l. pH	Minimum	Maximum	Minimum	Maximum				STANDARD UNITS		Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries:

i. Does the discharge from this outfall contain process wastewater?
- [ ] **Yes** - Go to Item ii. below.
- [X] **No** - Go to Item b. below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants:

i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from
- [ ] **Yes** - Concentration and mass data attached.
- [X] **No** - Go to Item ii. below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?
- [ ] **Yes** - Source or reason for presence in discharge attached
- [X] **Yes** - Quantitative or qualitative data attached
- [ ] **No**

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: **Lockheed Martin Corporation**	SPDES No.: **NY-0121894**	**Outfall No.:** 002

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from tables 6, 7, or 8, provide the results of at least one analysis for that pollutant, and determine the mass discharge based on the flow rate reported in Item 1.i. For each pollutant listed in Table 9, or any other toxic pollutant not listed in tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make additional copies of this table as necessary for each outfall.

Page   of

Pollutant and CAS Number	Effluent data							Units		Intake (optional)			Believed present, no sampling results available
	a. Maximum daily value		b. Maximum 30 day value (if available)		c. Long term average value (if available)		d. Number of analyses	a. Concentration	b. Mass	a. Long term average value		b. Number of analyses	
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass				(1) Concentration	(2) Mass		
CAS Number:													
CAS Number:													
CAS Number:													
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CAS Number:													

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: **Lockheed Martin Corporation**	SPDES No.: **NY-0121894**	**Outfall No.:** 002

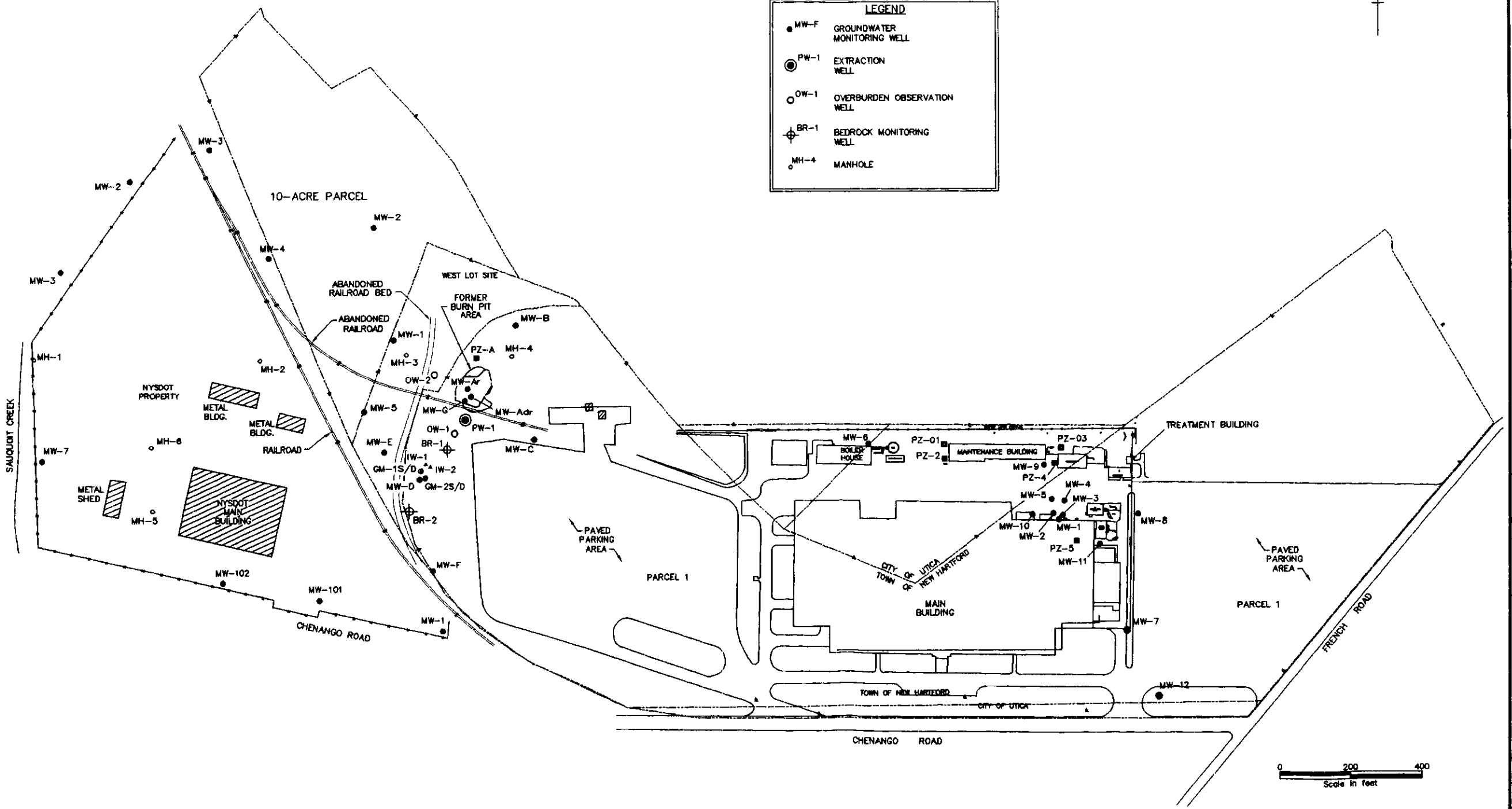
4. Existing Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results for the last three (3) years for each pollutant that you know or have reason to believe present in this discharge from this outfall, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a for this discharge.

Make as many copies of this table as necessary for each outfall. You can list the results from 24 sampling dates on each copy of this page.		Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:
Page Of		CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:
Date	Flow rate	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
	Units:	Units:	Units:	Units:	Units:	Units:	Units:	Units:

LEGEND

- MW-F — GROUNDWATER MONITORING WELL
- PW-1 — EXTRACTION WELL
- OW-1 — OVERBURDEN OBSERVATION WELL
- BR-1 — BEDROCK MONITORING WELL
- MH-4 — MANHOLE



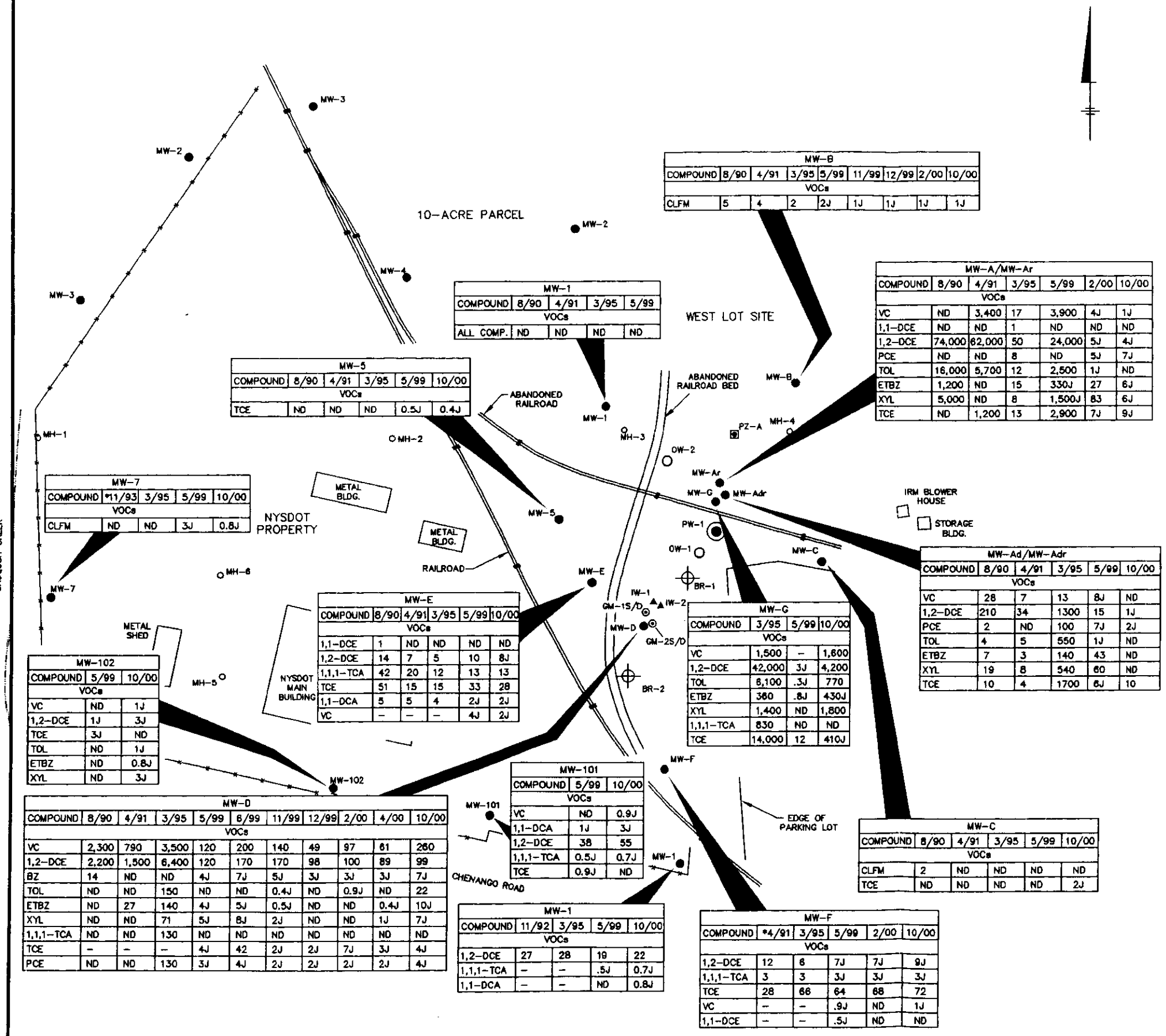
NO.	DATE	REVISION DESCRIPTION	BY / CKD

ARCADIS
441 New Karner Rd., Suite 4
Albany, New York 12205
Tel: 518/452-7826 Fax: 518/452-4396

SITE MAP

LOCKHEED MARTIN
WEST LOT SITE

PROJECT MANAGER M. SANFORD	DRAWING NUMBER 0274K
CHECKED BY N. TUDOR	PROJECT NUMBER AYD002650005
DRAWN BY FJF/Adecco	FIGURE NUMBER 2
DATE DRAWN 06-17-02	



MW-7				
COMPOUND	*11/93	3/95	5/99	10/00
VOCs				
CLFM	ND	ND	3J	0.8J

MW-5					
COMPOUND	8/90	4/91	3/95	5/99	10/00
VOCs					
TCE	ND	ND	ND	0.5J	0.4J

MW-1				
COMPOUND	8/90	4/91	3/95	5/99
VOCs				
ALL COMP.	ND	ND	ND	ND

MW-B								
COMPOUND	8/90	4/91	3/95	5/99	11/99	12/99	2/00	10/00
VOCs								
CLFM	5	4	2	2J	1J	1J	1J	1J

MW-A/MW-Ar						
COMPOUND	8/90	4/91	3/95	5/99	2/00	10/00
VOCs						
VC	ND	3,400	17	3,900	4J	1J
1,1-DCE	ND	ND	1	ND	ND	ND
1,2-DCE	74,000	62,000	50	24,000	5J	4J
PCE	ND	ND	8	ND	5J	7J
TOL	16,000	5,700	12	2,500	1J	ND
ETBZ	1,200	ND	15	330J	27	6J
XYL	5,000	ND	8	1,500J	83	6J
TCE	ND	1,200	13	2,900	7J	9J

MW-Ad/MW-Adr					
COMPOUND	8/90	4/91	3/95	5/99	10/00
VOCs					
VC	28	7	13	8J	ND
1,2-DCE	210	34	1300	15	1J
PCE	2	ND	100	7J	2J
TOL	4	5	550	1J	ND
ETBZ	7	3	140	43	ND
XYL	19	8	540	60	ND
TCE	10	4	1700	8J	10

MW-C					
COMPOUND	8/90	4/91	3/95	5/99	10/00
VOCs					
CLFM	2	ND	ND	ND	ND
TCE	ND	ND	ND	ND	2J

MW-D										
COMPOUND	8/90	4/91	3/95	5/99	8/99	11/99	12/99	2/00	4/00	10/00
VOCs										
VC	2,300	790	3,500	120	200	140	49	97	61	260
1,2-DCE	2,200	1,500	6,400	120	170	170	98	100	89	99
BZ	14	ND	ND	4J	7J	5J	3J	3J	3J	7J
TOL	ND	ND	150	ND	ND	0.4J	ND	0.9J	ND	22
ETBZ	ND	27	140	4J	5J	0.5J	ND	ND	0.4J	10J
XYL	ND	ND	71	5J	8J	2J	ND	ND	1J	7J
1,1,1-TCA	ND	ND	130	ND	ND	ND	ND	ND	ND	ND
TCE	–	–	–	4J	42	2J	2J	7J	3J	4J
PCE	ND	ND	130	3J	4J	2J	2J	2J	2J	4J

MW-E					
COMPOUND	8/90	4/91	3/95	5/99	10/00
VOCs					
1,1-DCE	1	ND	ND	ND	ND
1,2-DCE	14	7	5	10	8J
1,1,1-TCA	42	20	12	13	13
TCE	51	15	15	33	28
1,1-DCA	5	5	4	2J	2J
VC	–	–	–	4J	2J

MW-G			
COMPOUND	3/95	5/99	10/00
VOCs			
VC	1,500	–	1,600
1,2-DCE	42,000	3J	4,200
TOL	6,100	.3J	770
ETBZ	360	.8J	430J
XYL	1,400	ND	1,800
1,1,1-TCA	830	ND	ND
TCE	14,000	12	410J

MW-102		
COMPOUND	5/99	10/00
VOCs		
VC	ND	1J
1,2-DCE	1J	3J
TCE	3J	ND
TOL	ND	1J
ETBZ	ND	0.8J
XYL	ND	3J

MW-101		
COMPOUND	5/99	10/00
VOCs		
VC	ND	0.9J
1,1-DCA	1J	3J
1,2-DCE	38	55
1,1,1-TCA	0.5J	0.7J
TCE	0.9J	ND

MW-1				
COMPOUND	11/92	3/95	5/99	10/00
VOCs				
1,2-DCE	27	28	19	22
1,1,1-TCA	–	–	.5J	0.7J
1,1-DCA	–	–	ND	0.8J

MW-F					
COMPOUND	*4/91	3/95	5/99	2/00	10/00
VOCs					
1,2-DCE	12	6	7J	7J	9J
1,1,1-TCA	3	3	3J	3J	3J
TCE	28	66	64	68	72
VC	–	–	.9J	ND	1J
1,1-DCE	–	–	.5J	ND	ND

LEGEND

- MW-F — GROUNDWATER MONITORING WELL
- PW-1 — OVERBURDEN PUMPING WELL
- OW-1 — OVERBURDEN OBSERVATION WELL
- BR-1 — BEDROCK MONITORING WELL
- PZ-A — PIEZOMETER
- MH-4 — MANHOLE

VOLATILE ORGANIC COMPOUNDS DETECTED IN GROUNDWATER IN ug/L (ppb)

MW-		WELL DESIGNATION
COMPOUND	3/95	SAMPLE DATE
VOCs		VOLATILE ORGANIC COMPOUNDS
VC	ND	VINYL CHLORIDE
1,1-DCE	ND	1,1-DICHLOROETHENE
1,2-DCE	ND	1,2-DICHLOROETHENE (TOTAL)
BZ	ND	BENZENE
PCE	ND	TETRACHLOROETHENE
TOL	ND	TOLUENE
CLBZ	ND	CHLOROBENZENE
ETBZ	ND	ETHYLBENZENE
XYL	ND	XYLENES (TOTAL)
CLFM	ND	CHLOROFORM
1,1,1-TCA	ND	1,1,1-TRICHLOROETHANE
TCE	ND	TRICHLOROETHENE
1,1-DCA	ND	1,1-DICHLOROETHANE

ND NOT DETECTED

NOTES:

1. SOURCE: BBL 1995.

* 4/91 AND 11/93 GROUNDWATER SAMPLING RESULTS AT NYSDOT PROPERTY BASED ON SAMPLES OBTAINED BY NYSDEC.

0 200 400
Scale in feet

NO.	DATE	REVISION DESCRIPTION	BY / CKD

ARCADIS
441 New Karner Rd. Suite 4
Albany, New York 12205
Tel: 518/452-7826 Fax: 518/452-4396

HISTORICAL VOC CONCENTRATIONS IN GROUNDWATER

LOCKHEED MARTIN
WEST LOT SITE

PROJECT MANAGER M. SANFORD	DRAWING NUMBER G274S
LEAD DESIGN PROF. N. TUDOR	PROJECT NUMBER AY0002650002
CHECKED BY FJF/Adecco	FIGURE NUMBER 3
DRAWN BY 7-08-02	DATE